IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A method, comprising:

forming a die with a surface;

forming conductive bumps on the surface of the die, the conductive bumps having a height equal or greater than the height of a waveguide, wherein forming conductive bumps comprises:

depositing a mask material layer on the die;

patterning the mask material layer to form pad openings;

depositing a second conductive layer in the pad openings of the patterned mask; and

removing the mask material;

forming a substrate; and

bonding the conductive bumps to the substrate.

2. (original) The method of claim 1, wherein the waveguide has a height in a range of about 95 micrometers to about 110 micrometers.

3. (original) The method of claim 1, wherein the conductive bumps have a height greater than about 80 micrometers.

4. (original) The method of claim 1, wherein the conductive bumps have a height in a range from 80 micrometers to about 120 micrometers.

5. (original) The method of claim 1, wherein the conductive bumps have a height in a range from 95 micrometers to about 110 micrometers.

6. (currently amended) The method of claim 1,wherein forming conductive bumps further comprises:

depositing a first thin conductive layer on the die; and

depositing the [[a]] mask material layer on the first thin conductive layer. [[;]]

~~patterning the mask material layer to form pad openings;~~

~~depositing a second conductive layer in the pad openings of the patterned mask; and~~

~~removing the mask material.~~

7. (original) The method of claim 6, further comprising depositing a protection layer on the second conductive layer.

8. (original) The method of claim 7, further comprising depositing a barrier layer between the protection layer and second conductive layer.

9. (original) The method of claim 7, wherein bonding the conductive bumps to the substrate comprises bonding the conductive bumps to the substrate with a fluxless soldering process.

10. (original) The method of claim 1, wherein the conductive bumps are formed on a plurality of dies that are part of a wafer.

11. (original) The method of claim 10, further comprising singulating the die from the wafer after forming the conductive bumps.

12. (original) The method of claim 1, wherein the conductive bumps are bonded to the substrate at a bonding temperature and the conductive bumps have a melting point higher than the bonding temperature.

13. (original) The method of claim 12, wherein the bonding temperature is at least a melting point of a solder material that bonds the conductive bumps to the substrate.

14. (original) The method of claim 13, wherein the bonding temperature is about 230 degrees Celsius.

15. (withdrawn) A device, comprising:

a die;

a substrate separated from the die by a gap;

a waveguide between the substrate and the die, the waveguide having a height; and

a plurality of conductive bumps that extend from the die to the substrate and connect the die with the substrate, wherein the conductive bumps have a height equal to or greater than the height of the waveguide.

16. (withdrawn) The device of claim 15, wherein the waveguide has a height in a range of about 95 micrometers to about 110 micrometers.

17. (withdrawn) The device of claim 15, wherein the conductive bumps have a height greater than about 80 micrometers.

18. (withdrawn) The device of claim 15, wherein the conductive bumps have a height in a range from 80 micrometers to about 120 micrometers.

19. (withdrawn) The device of claim 15, wherein the conductive bumps have a height in a range from 95 micrometers to about 110 micrometers.

20. (withdrawn) The device of claim 15, wherein the conductive bumps each comprise:

a first conductive layer;

a second conductive layer; and

a protection layer.

21. (withdrawn) The device of claim 20, wherein the first conductive layer comprises an adhesion layer and a seed layer.

22. (withdrawn) The device of claim 21, wherein the adhesion layer comprises at least one of Ti, TiN, Cr, and Ta.

23. (withdrawn) The device of claim 21, wherein the seed layer comprises at least one of Ni, NiV, Co, Cu, Au, and Ag.

24. (withdrawn) The device of claim 20, wherein first conductive layer comprises at least one of Ti, TiN, Cr, Ta, Ni, NiV, Co, Cu, Au, and Ag.

25. (withdrawn) The device of claim 20, wherein the second conductive layer comprises at least one of Cu, Ni, Co, Fe, Au, and Ag.

26. (withdrawn) The device of claim 20, wherein the protection layer comprises at least one of Au, Pt, Pd, Ag, Ir, Os, Ru, and Rh.

27. (withdrawn) A device, comprising:

a die;

a substrate separated from the die by a gap;

a waveguide between the substrate and the die, the waveguide not being located in a trench on the die or the substrate; and

a plurality of bumps that extend from the die to the substrate and connect the die with the substrate.

28. (withdrawn) The device of claim 27, wherein the waveguide has a height greater than approximately 90 micrometers.

29. (withdrawn) The device of claim 27, wherein the bumps have a height equal to or greater than the height of the waveguide.

30. (withdrawn) The device of claim 27, wherein the bumps are formed by a method comprising:

depositing a first conductive layer on the die;

depositing a mask material layer on the thin conductive layer;

patterning the mask material layer to form pad openings;

depositing a second conductive layer in the trenches of the patterned mask; and

removing the mask material.

31. (new) The method of claim 1, wherein the second conductive layer comprises at least one of Cu, Ni, Co, Fe, Au, and Ag.

32. (new) The method of claim 6, wherein the first conductive layer comprises at least one of Ti, TiN, Cr, Ta, Ni, NiV, Co, Cu, Au, and Ag.

33. (new) The method of claim 7, wherein the protection layer comprises at least one of Au, Pt, Pd, Ag, Ir, Os, Ru, and Rh.

34. (new) A method, comprising:

forming a plurality of conductive bumps on a surface of a die, wherein forming the conductive bumps comprises:

depositing a first thin conductive layer on the die;

depositing an unpatterned layer of mask material on the first thin conductive layer;

patterning the layer of mask material to form a plurality of trenches through the mask material to the first thin conductive layer;

depositing a second conductive layer in the trenches;

removing substantially all the mask material after depositing the second conductive layer; and

removing substantially all of the first thin conductive layer except for portions of the first thin conductive layer beneath the second conductive layer; and

bonding the conductive bumps to a substrate with a waveguide between the substrate and the die, wherein the waveguide is not located within a trench in the surface of the substrate.

35. (new) The method of claim 34, wherein the conductive bumps have a height greater than a height of the waveguide.

36. (new) The method of claim 35, wherein the height of the waveguide is in a range of about 95 micrometers to about 110 micrometers.

37. (new) The method of claim 34, wherein bonding the conductive bumps to the substrate comprises positioning the conductive bumps adjacent solder pads on the substrate and reflow soldering the solder pads to bond the conductive bumps to the substrate, wherein the conductive bumps are reflow soldered to the substrate at a bonding temperature and the conductive bumps have a melting point higher than the bonding temperature.

38. (new) The method of claim 34, wherein the second conductive layer has a thickness between about 70 micrometers and about 120 micometers.